UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,090	03/23/2004	Tetsuya Hoya	0051-0221PUS1	1875

2292 7590 05/15/2006

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
ALLEN, NICOLE L	

ART UNIT	PAPER NUMBER
2129	

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/806,090	HOYA, TETSUYA	
	Examiner	Art Unit	
	Nicole L. Allen	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 18-21* is/are rejected.

7)☐ Claim(s) *17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> *The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.*

Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 states "The method according to claim 13, wherein the neurons in the self-organizing neural network structure have a plurality of modalities different from one another." The applicant fails to particularly point out and distinctly claim the subject matter. Claim 16 states "The method according to claim 13, wherein the neurons in the self-organizing neural network structure have a single modality." The clam limitation in claim 17 is confusing to the examiner because in claim 16 the applicant claims that the neural network structure have a "single" modality, and in the claim limitation according to claim 17 the neural network structure have a "plurality" of modalities; making claim 17 indefinite.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> *A person shall be entitled to a patent unless –*
>
> *(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.*

Claims 1-4, 6-9, 11-13, 15-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Mita (US Patent No. 6,243,490).

As per claims 1 and 13, Mita teaches an interconnecting neural network system comprising: a neural network unit that includes a plurality of neurons (Fig. 2), each of the neurons outputting an excitation strength (Col. 10, Lines 51-54) according to a similarity between an input vector and a centroid vector (Fig. 2; the examiner reads the intermediate layer as a centroid vector) based on a kernel function

a network control unit (Fig. 2, the neural network unit is considered to be the network control unit) that constructs an artificial neural network structure by interconnecting neurons relating to each other among the neurons in the neural network unit via a weight (Col. 11, Lines 7-14; the weights are referred to as "strength". A strength is calculated between the input later and the intermediate layer and between the intermediate layer and the output layer), wherein each of the neurons in the neural network unit outputs an excitation strength (Col. 10, Lines 51-54) according to a similarity between an input vector and a centroid vector based on a kernel function (Fig. 2; the examiner reads the intermediate layer as a centroid vector) when the each neuron is excited by the input vector applied from an outside, and outputs a pseudo excitation strength obtained based on an excitation strength output from the other neuron when the each neuron is excited in a chain reaction to excitation of the other neuron connected to the each neuron (Col. 10. Lines 51-65; the coupling between one neuron to the next neuron in the next layer is represented by the solid lines).

As per claim 2, Mita teaches the interconnecting neural network system according to claim 1, wherein each neuron in the neural network unit outputs the pseudo excitation strength and also outputs the centroid vector of the each neuron when the each neuron is excited in a chain reaction to the excitation of the other neuron connected to the each neuron (Col. 10. Lines 51-65; the coupling between one neuron to the next neuron in the next layer is represented by the solid lines and the small circles represents coupling strength).

As per claims 3 and 9, Mita teaches the interconnecting neural network system according to claim 1, wherein the network control unit interconnects the neurons relating to each other among the neurons in the neural network unit, based on an order of the neurons added or excited at time series in association with a plurality of input vectors applied to the neural network unit from the outside (Fig. 2, Col. 10. Lines 51-65; the coupling (connection) between one neuron to the next neuron in the next layer is represented by the solid lines and the small circles represents coupling strength) .

As per claims 4 and 15, Mita teaches the interconnecting neural network system according to claim 1, wherein the network control unit trains the weight that connects the neurons to each other, based on the excitation strength of the each neuron in the neural network unit (Col. 11, Lines 7-33; training is the method of propagating the error back after each iteration and performing appropriate weight adjustments. The examiner reads that the weight (coupling strength) has to be prepared (trained) to suitably decide an initial value of the weight (coupling strength). A teach signal is also used to compare the coupling strength between the input and output layer. This process is indicated by arrow C and D in Figure 2).

As per claim 6, Mita teaches the interconnecting neural network system according to claim 1, wherein the each neuron in the neural network unit is an intermediate layer neuron using, as the centroid vector, centroid data in a matrix form (Col. 13, Lines 25-29; the examiner reads that the neural network can be put into table form, which can be in the form of a matrix) in light of time series changes, and the each intermediate layer neuron is connected to an output layer neuron that outputs a change in the excitation strength output from the each intermediate layer neuron at time series (Col. 12, Lines 59-63, Equation (10).

As per claims 7, 11, 18 and 21, Mita teaches the interconnecting neural network system according to claim 1, wherein the kernel function employed in the each neuron in the neural network

unit includes a radial basis function (Col. 11, Line 55, Equation 1; the examiner reads the radial basis function is just the weighted sum which is calculated using equation 1).

As per claim 8 Mita teaches a method of constructing an interconnecting neural network structure, the method comprising the steps of:

preparing an artificial neural network structure including a plurality of neurons (Fig. 2), each of the neurons outputting an excitation strength (Col. 10, Lines 51-54) according to a similarity between an input vector and a centroid vector based on a kernel function (Fig. 2; the examiner reads the intermediate layer as a centroid vector), the neurons relating to each other interconnected in the artificial neural network structure via a weight (Col. 11, Lines 7-14; the weights are referred to as "strength". A strength is calculated between the input later and the intermediate layer and between the intermediate layer and the output layer.)

training the weight that connects the neurons to each other, based on the excitation strength of the each neuron (Col. 11, Lines 7-33; training is the method of propagating the error back after each iteration and performing appropriate weight adjustments. The examiner reads that the weight (coupling strength) has to be prepared (trained) to suitably decide an initial value of the weight (coupling strength). A teach signal is also used to compare the coupling strength between the input and output layer. This process is indicated by arrow C and D in Figure 2).

As per claims 12 and 19, Mita teaches a computer readable recording medium storing an interconnecting neural network structure construction program that allows a computer to execute the method according to claim 8 (Col. 21, Lines 46-67, Fig. 18; diagram showing the construction of the network, which includes a monochromatic processor.)

As per claim 16, Mita teaches the method according to claim 13, wherein the neurons in the self-organizing neural network structure have a single modality (Col. 5, Line 1-Col. 6, Line 67; the examiner reads "image processing" as a form of visual modality).

As per claim 20, Mita teaches an interconnecting neural network system comprising:

a plurality of intermediate layer neurons (Fig. 2), each of the intermediate layer neurons outputting an excitation strength (Col. 10, Lines 51-54) according to a similarity between an input vector and a centroid vector (Fig. 2; the examiner reads the intermediate layer as a centroid vector) based on a kernel function

each of the intermediate layer neurons using centroid data in a matrix form (Col. 13, Lines 25-29; the examiner reads that the neural network can be put into table form, which can be in the form of a matrix) in light of time series changes as the centroid vector;

an output layer (Fig. 1, and Fig. 2) neuron connected to each of the intermediate layer neurons and outputting a change in the excitation strength output from the each intermediate layer neuron at time series (Col. 12, Lines 59-63, Equation (10).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

Claims 5, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mita in view of Ayala (US Patent Pub No. 2004/0143559)

As per claims 5, 10 and 14, Mita teaches the interconnecting neural network system according to claim 1 as set forth above.

Mita does not disclose wherein the network control unit removes the each neuron at a predetermined timing.

Ayala discloses wherein the network control unit removes the each neuron at a predetermined timing (Fig. 15, Page. 9, Para. 0098)

Mita and Ayala are analogous art because they are from the same field of endeavor, neural networks.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the action of self-destruct in a neural network system.

Motivation for doing so would have been to be able to remove a neuron when it become idle.

Therefore, it would have been obvious to combine Ayala with Mita for the benefit of having a neural network the removes a neuron to obtain the invention as specified in

claims 5, 10 and 14.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole L. Allen whose telephone number is (571) 272-5830. The examiner can normally be reached on Monday-Friday 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on (571) 272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

5/11/06
David Vincent
Supervisory Patent Examiner

NLA